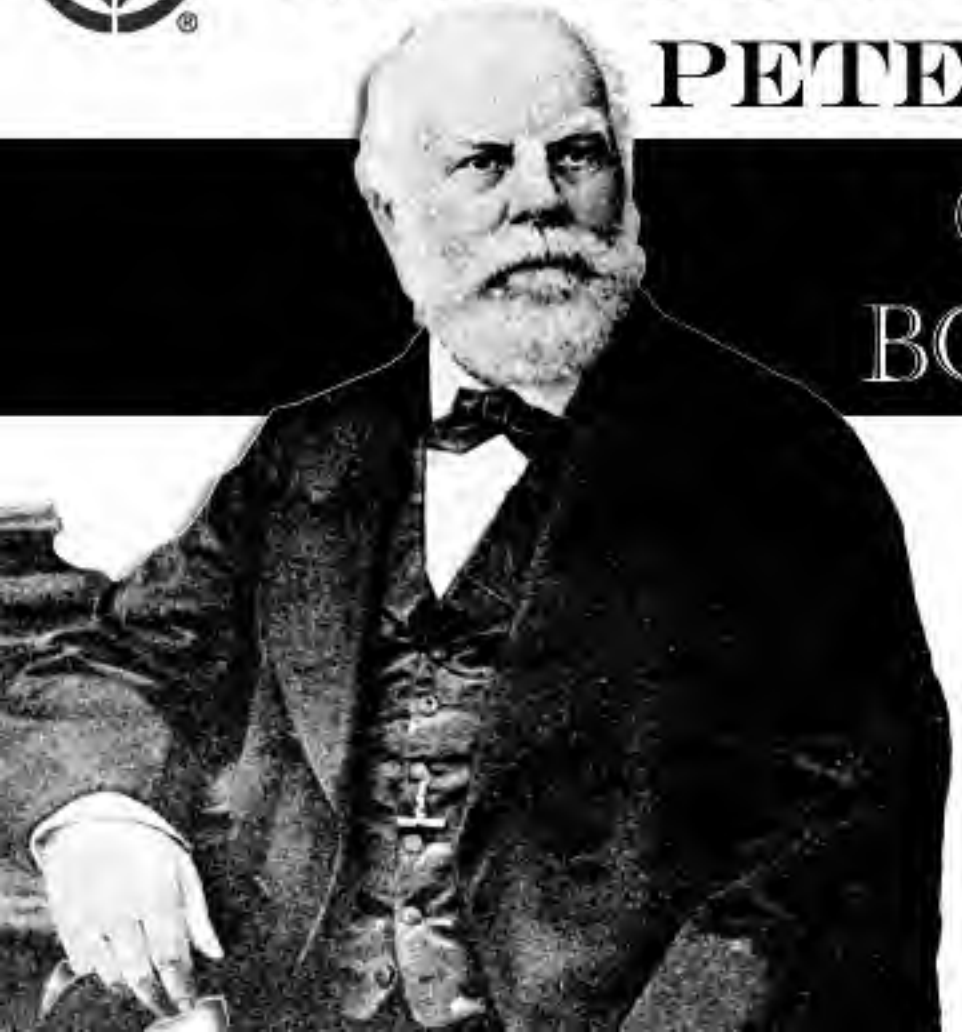
Missouri Botanical Garden
Peter H. Raven Library

George Engelmann Botanical Notebooks



Pagination Note:
Since many of the items lack a specific page number, the page number displayed online refers to the sequentially created number each item was given upon cataloging the materials.

interrupted descent and ascent took place from January to December, we find in 1862 some interruptions in the steps of that ladder. The electricity in February, 1862, is about four degrees higher than that of January, April somewhat higher than March, and July is the lowest instead of September in 1861. These trifling irregularities may be accounted for by differences in temperature and relative humidity, and by a greater number of thunderstorms in 1862. January of 1862, for instance, was so unusually rainy, that its relative humidity too was unusually high, diminishing thus electricity. But the general features of distribution of electricity throughout the year are apparent in both years, and we may in that respect divide the twelve months of each year into two or three groups. Computing the months which give the highest electricity and those which give the lowest in each year, we find that in both years the months of January, February, March, April, November and December exhibit the highest, and the months of May, June, July, August, September and October the lowest electricity. The first group gives

The aggregate monthly [illegible] of 71.5 degrees of electricity in 1861

VI. The appearance of negative electricity was connected in

1861. No. times.	1862. No. times.	
30	32	with thunderstorms.
23	28	with rains without thunder and lightning.
20	4	with dry storms (without rain and without thunder and lightning).
4	3	with snow.
1	0	with fog.
78	67	

VII. *Relation of Rain and Snow to Electricity.*

Rain without thunderstorm was accompanied

	By Positive Electricity.		By Negative Electricity.		By no Electricity.	
	In 1861.	In 1862.	In 1861.	In 1862.	In 1861.	In 1862.
January	7	5	3	2		2
February	2	1	4	1		
March		5	6	4		
April	8	6	7	11		1
May	10	7	1	1	3	1
June	7	1				3
July	2	4				3
August	3		1		1	2
September	4			1	4	8
October	3	1	1	1	7	1
November	2	3		7		7
December	2	3				6
	50 + el.	36 + el.	23 — el.	28 — el.	15 no el.	34 no el.

Snowing was accompanied

	By Positive Electricity.		By Negative Electricity.		By no Electricity.	
	In 1861.	In 1862.	In 1861.	In 1862.	In 1861.	In 1862.
January	3	9		2		
February	12	8		1		
March	3	12				
October		1				
November		4				
December	5	2	2			1
	23 + el.	36 + el.	2 — el.	3 — el.		1 no el.

REMARKS.

The monthly mean of atmospheric electricity in 1862 was not quite so regular as that in 1861. While in 1861 an un-

in 1862.

Or we may divide the twelve months of each year into three groups. The first group with the highest electricity is formed by the months of January, February, November and December; the second with a mean electricity by the months of March, April, May and October; and the third with the lowest electricity by the months of June, July, August and September.

The aggregate monthly mean of

The first group	in 1861 is	52.9—	in 1862,	54.6
The second "	"	33.5	"	35.2
The third "	"	14.1	"	10.5

Thus in 1861 the third group prevailed, and in 1862 the first and second. But these differences are so well balanced throughout the year, that the mean of the whole year in 1861 and in 1862 is exactly the same, namely, 8.4. Such an identity in the yearly result, even to decimals, is of course not to be expected every year; but it seems to prove, at least, that the yearly mean of electricity is as constant as that of temperature, of relative humidity, and of atmospheric pressure.

The third table, showing the daily periodicity of atmospheric electricity, confirms the daily two maxima and two minima of electricity as an undeniable fact.

really from Bethlehem?

Isoetes riparia

Oct 20. 1866

" Bethlehem, Durand, very small specimens "

×415 0.028–0.032 mm long

9–10 leaves – 2–2½ inches long

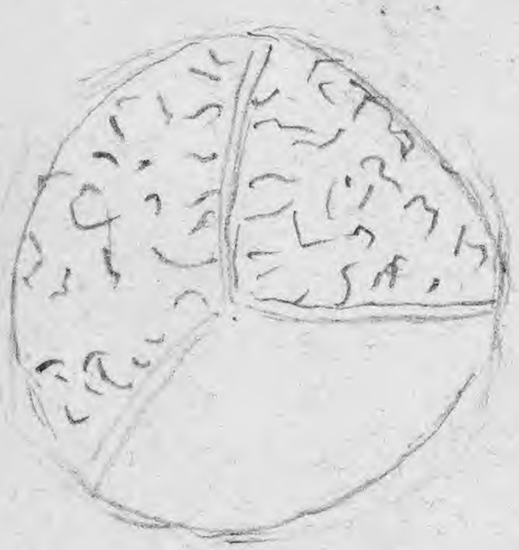
I. riparia

can not be I. Engelmanni

[and is probably not from Bethlehem]

microspores smooth or very slightly tubercled

diam of Spores 0.47–0.56



irregular ridges scarcely anastomosing

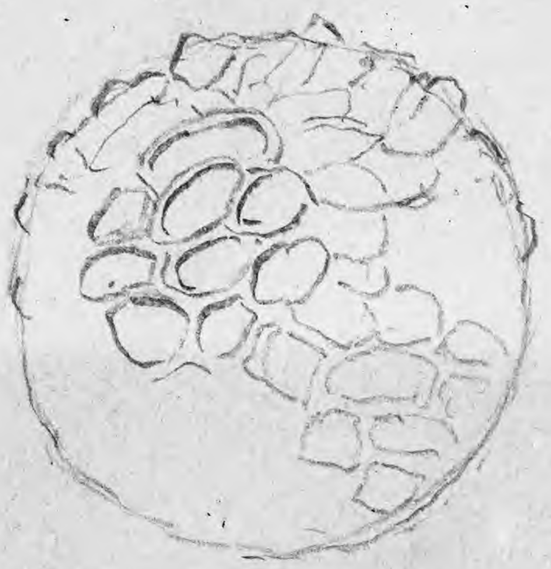
13719

ALEX. LEITCH,

APOTHECARY & PHARMACEUTIST,

Marble Building Cor. Fourth & Clive Sts. St. Louis, Mo.

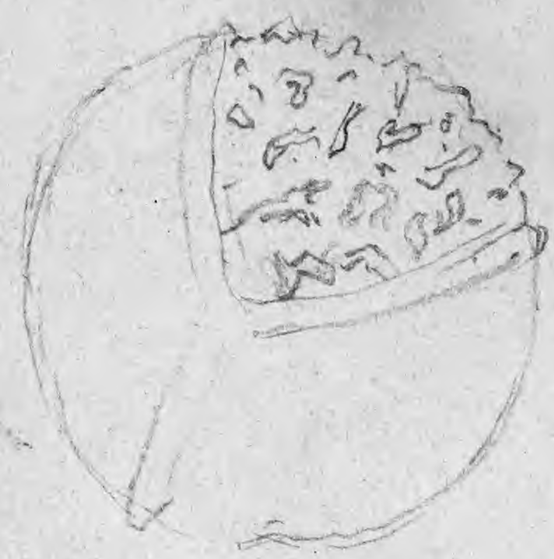
Isoetes riparia L. Jan 6 1866
Canada Watt visit.
unripe spores Plat sent to Braun



$\frac{32}{60}$ = 0.53 mm diam

no doubt also a specimen
of I. Morrisii

sent to Braun although noticed
(poor) who taken it for a
riparia without stomata,
but with sclerenchyma cells;
in his letter of April 3. 1867
where he names it provisionally
I. Canadensis — between
Carentii & riparia



13720

Alex. Leitch

APOTHECARY & PHARMACEUTIST,

COR. 4TH & OLIVE STS., ST. LOUIS.

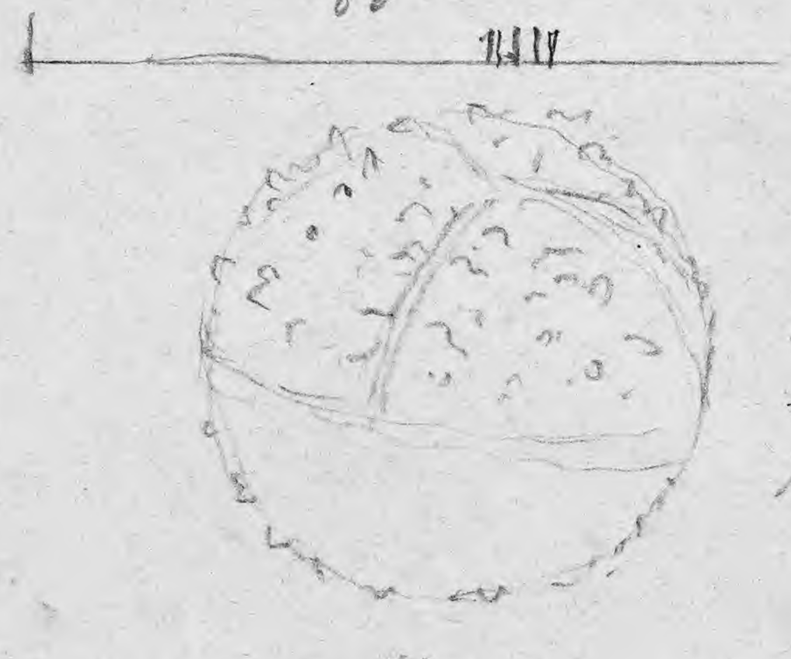
T. ~~Dracunculus~~ ?
Viparus ?

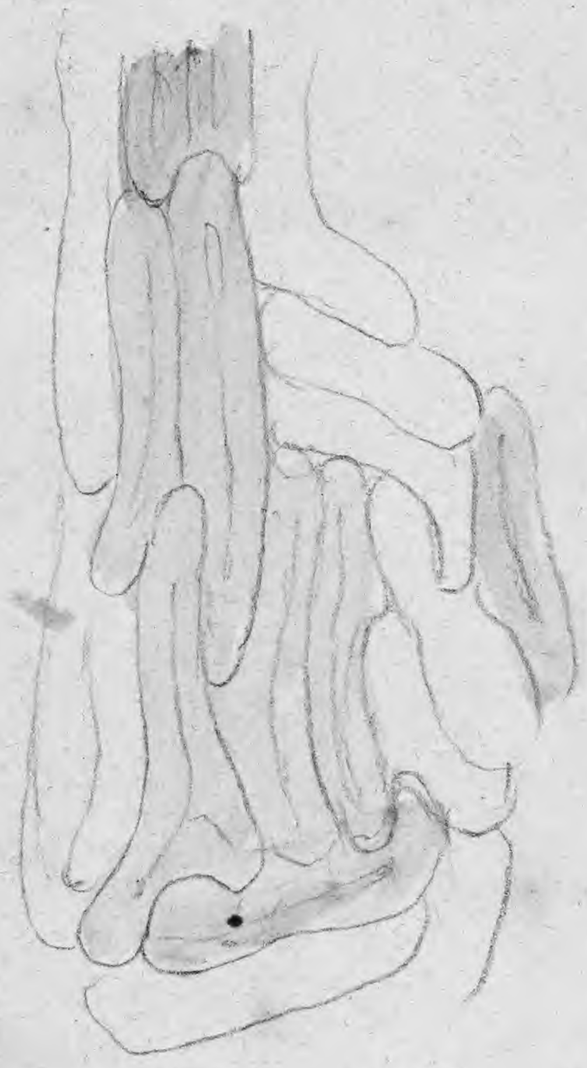
Dec 24 1866

Cornish, Maine, J. W. Dickering 1859

diam $\frac{28-32.5}{60}$ = 0.47 – 0.54 mm

ex H. Eaton No 7





Spinules often somewhat inflected, short, irregular thin appearing

Sclerodermally of spores very pale yellow

see spec & figure of Kennebunk plant Maine
referred to Lycoperdon nubrum

13721

ALEX. LEITCH,

APOTHECARY & PHARMACEUTIST,

Marble Building Cor. Fourth & Olive Sts. St. Louis, Mo.

D. riparia

Kennebunk, Maine 1859

Dec 14 1866

= Hb Gray

small plants 10 leaves

12 – 14 centimeters

no stomata seen

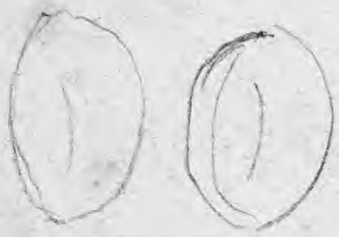
angles very prominent on spores

(Believed I saw again 27/6 67

see specimen of Cornish, Maine plant, so from Mr Brown

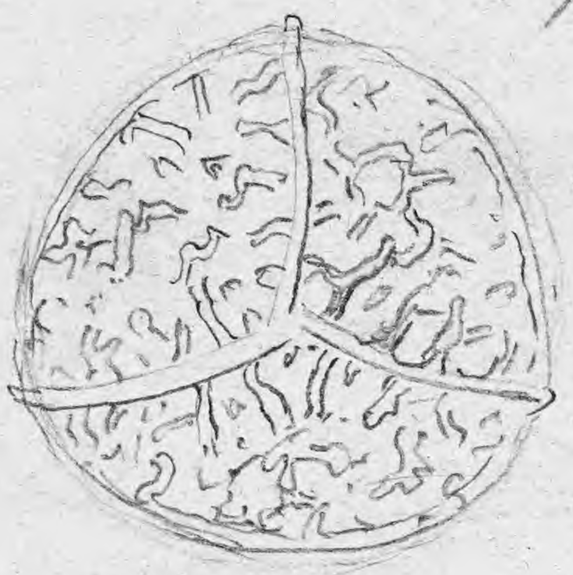
28 – 33.5 / 60

diam of spor = 0.46 – 0.56

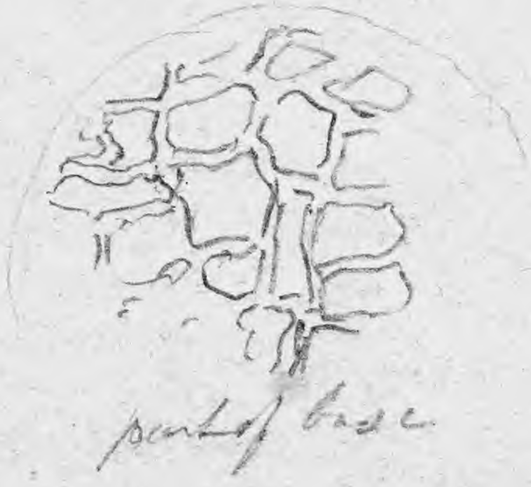


12 – 13 / 415 = 0.029 – 0.031

length of microspores



Cells of Sporang – x 280



part of base

x 2

macrosporang

x 2

microsporang

13722

Alex. Leitch,

APOTHECARY & CHEMIST,

Cor 4th & Olive Sts. St. Louis.

Isoetes lacustris? riparia? Dec 24 1866

Brattleborough, shore of Connecticut River

C. C. Frost 1866 cf Mr Eaton No 6

leaves slender, green

12–14 cm long

2 discovered

no stomata

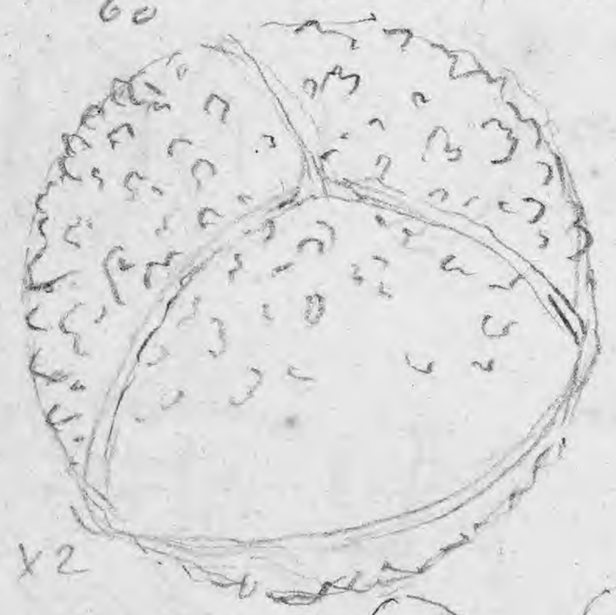
6 yes! 27/6 67

Why not rather

Crombie? 1882

Diam of Spores

$\frac{32-38}{60} = 0.53-0.63$ mm



x2

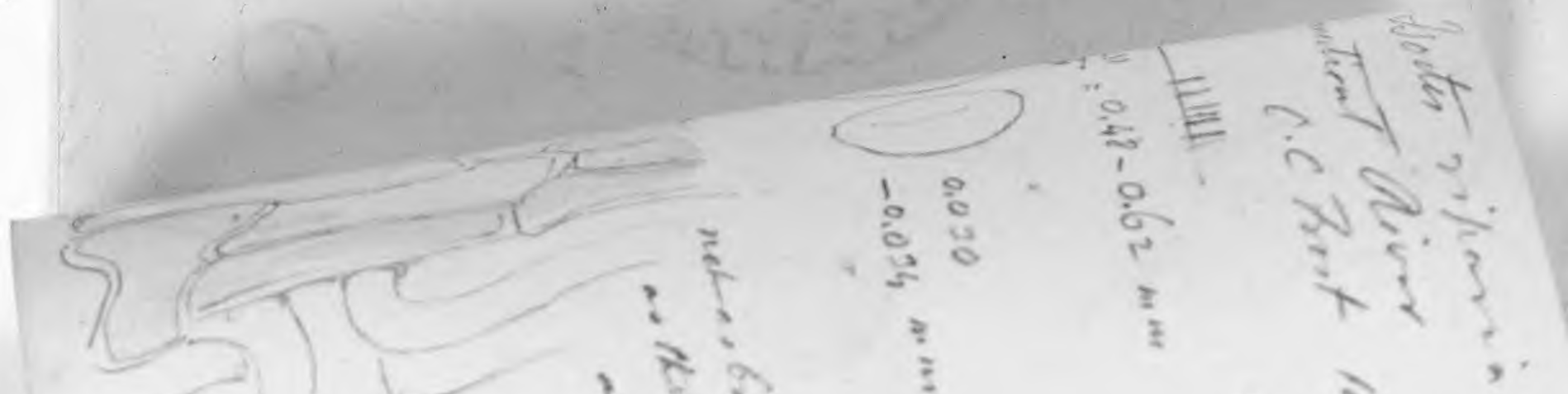
$\frac{14-15.5}{415} = 0.0034-0.037$ mm

13723

ALEX. LEITCH,

APOTHECARY & PHARMACEUTIST,

Marble Building Cor. Fourth & Olive Sts. St. Louis, Mo.



Jan 10 1867

Sodes riparia

Connecticut River opp. Brattleborough

C.C Bart 1866

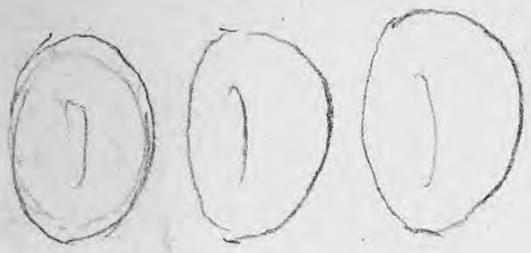
10–15 leaves

H. Mann mss.

15–20 C M long

$\frac{29-37}{60}$ = 0.48 – 0.62 mm

mesospores thin of riparia without doubt



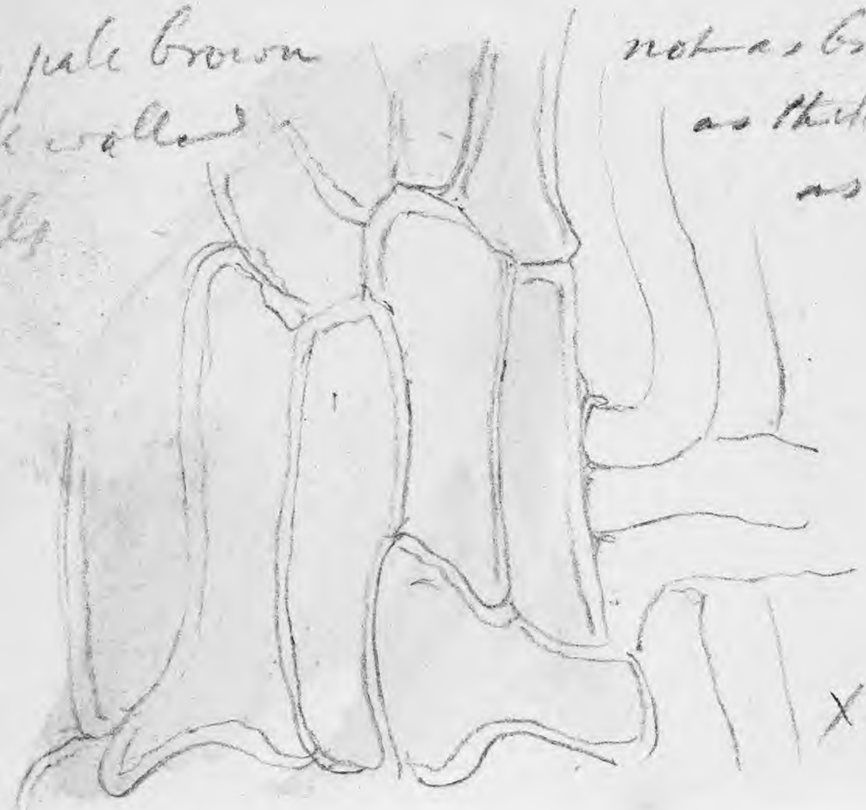
0.030

– 0.034 mm

no doubt same plet as that ex Hb Eaton

very pale brown thick walled cells

not as brown and as thick walled as elsewhere



X260

13724

ALEX. LEITCH,

APOTHECARY & PHARMACEUTIST,

Marble Building Cor. Fourth & Olive Sts. St. Louis, Mo.

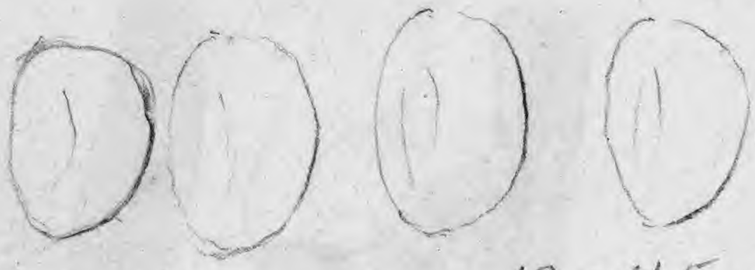
Isoetes riparia

Dec 14 1866

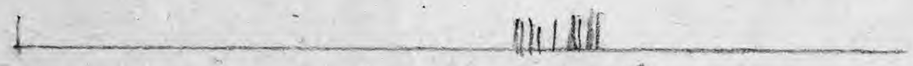
Dr J. W. Robbins, 1864, Uxbridge Mass, in Herb Gray

diam of bulb (pressed)
2 centim.
leaves very slender, abt 35-40
12-16 centim. long.

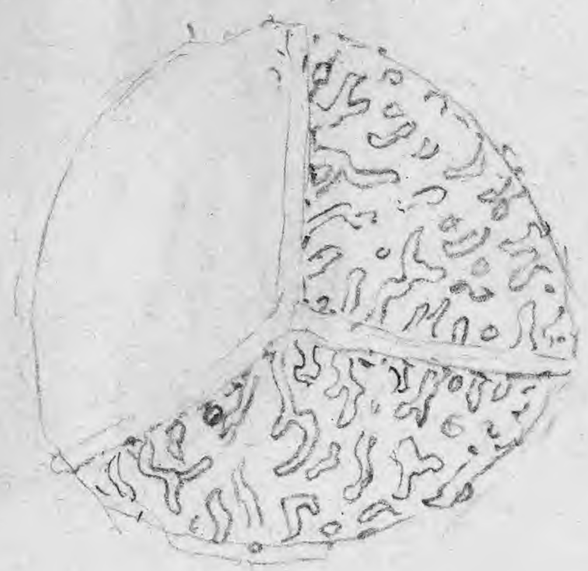
leaves with stomata



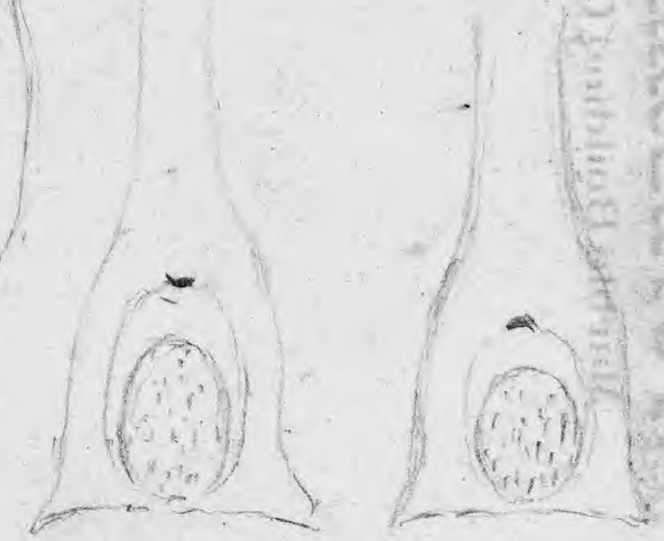
microspores $\frac{12-14.5}{415} = 0.030-0.035$ mm



diam of macrospores $\frac{30.5-36}{60} = 0.51-0.60$ mm



×2



microsporing

13725

ALEX. LEITCH,

APOTHECARY & PHARMACEUTIST,

Marble Building Cor. Fourth & Olive Sts. St. Louis, Mo.

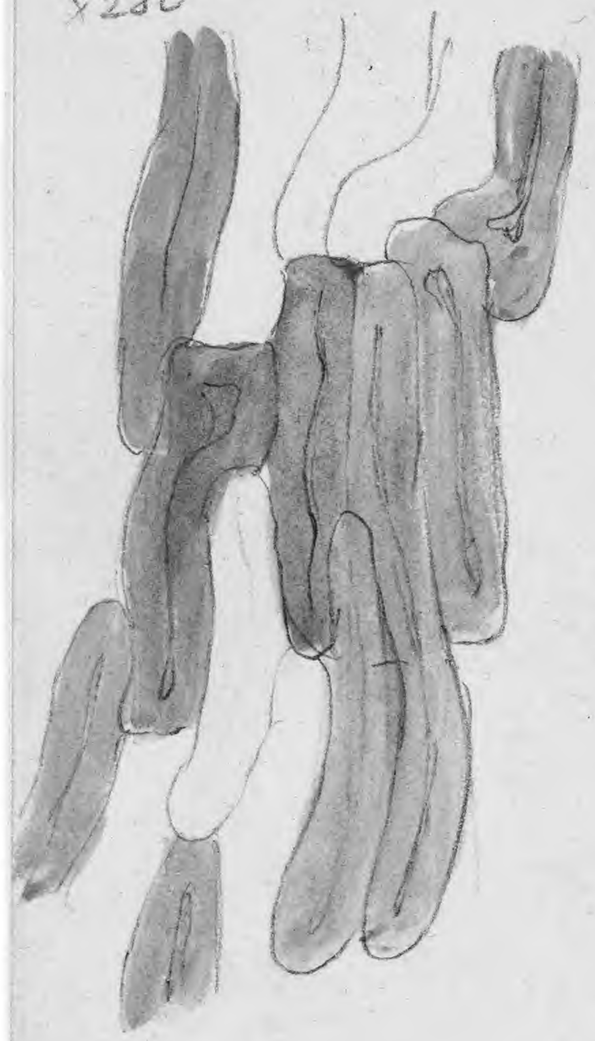
Dec. 14 1866

Spores

Dr Robbins, Uxbridge 1864 slender large plant

Hs Gray leaves 12-16 centimet long

×280



×280

Sporangia brown spotted

13726

ALEX. LEITCH,

APOTHECARY & PHARMACEUTIST,

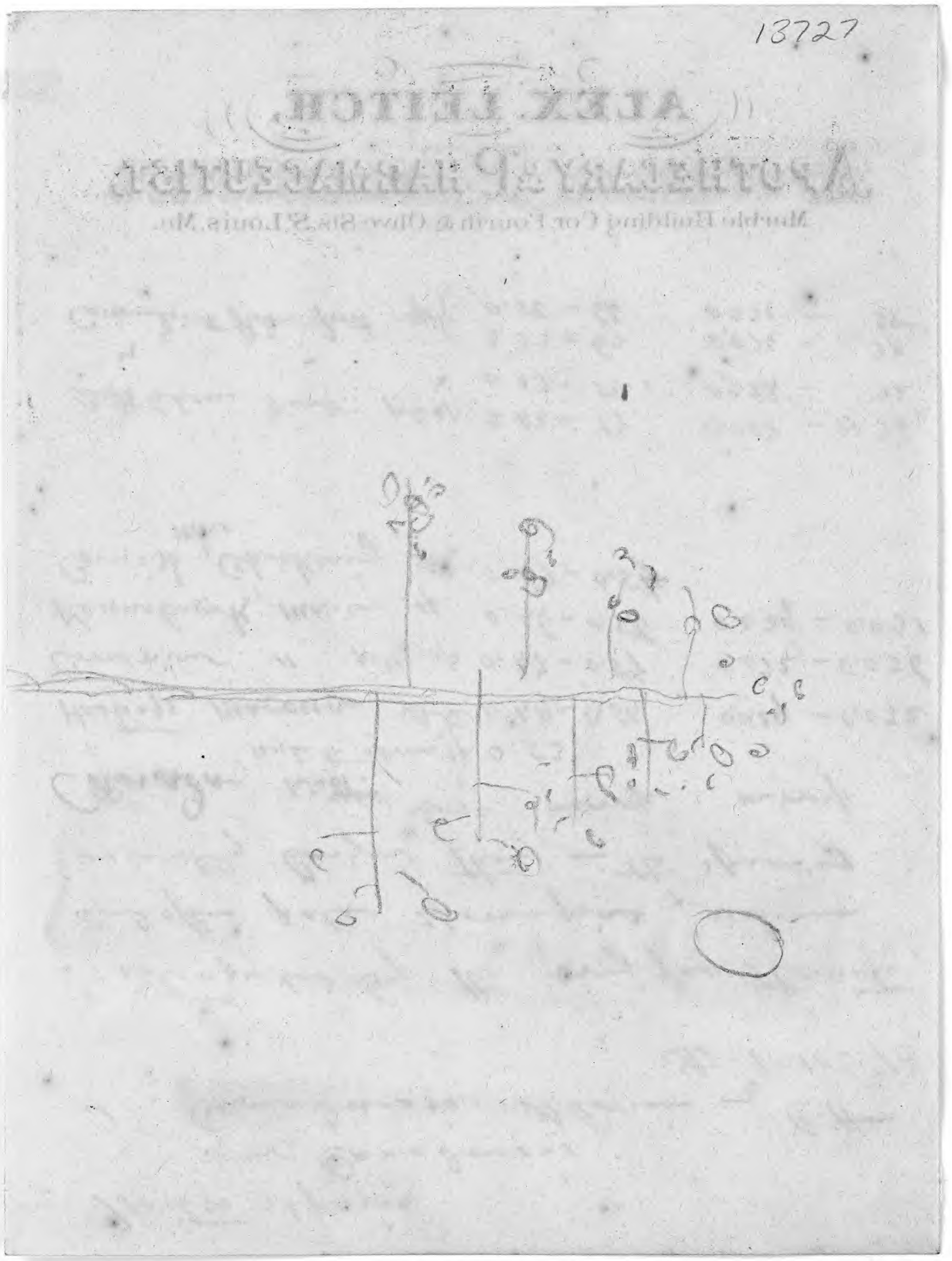
Marble Building Cor. Fourth & Clive Sts. St. Louis, Mo.

Isoetes riparia
var. Canadensis
I. Canadensis A Br — i. l. Itt
Apr 1867

Distinguished by the very few stomata, and often pale sporangia, which usually larger than itt spring.

Canada, Watt. (sent to Br.)	Sporangia sp. 0.53	macrosp.	microsp.
Hastings, Macoun	white	0.49 – 0.54	0.029 – 0.032
Crowrivers "	pale sp	0.47 – 0.57	0.032 – 0.036
Kennebunk, Maine	sp.	0.46 – 0.56	0.029 – 0.031
Cornish, Chickering Mine	sp.	0.47 – 0.57	

Bethlehem Jenne	pale sp.	0.44 – 57.	0.028 – 0.034
		0.47 – 56	0.028 – 32
" " Connecticut River Frost	sp.	0.53 – 63	0.024 – 37
		0.56 – 66	0.031 – 35



Isoetes paludosa Braun July 30 1866
= eatt

On an island near Bethlehem in the Lehigh River
in the sand and mud of the River bank.

E. Durand mis 1866

Leaves 5–6 inches long

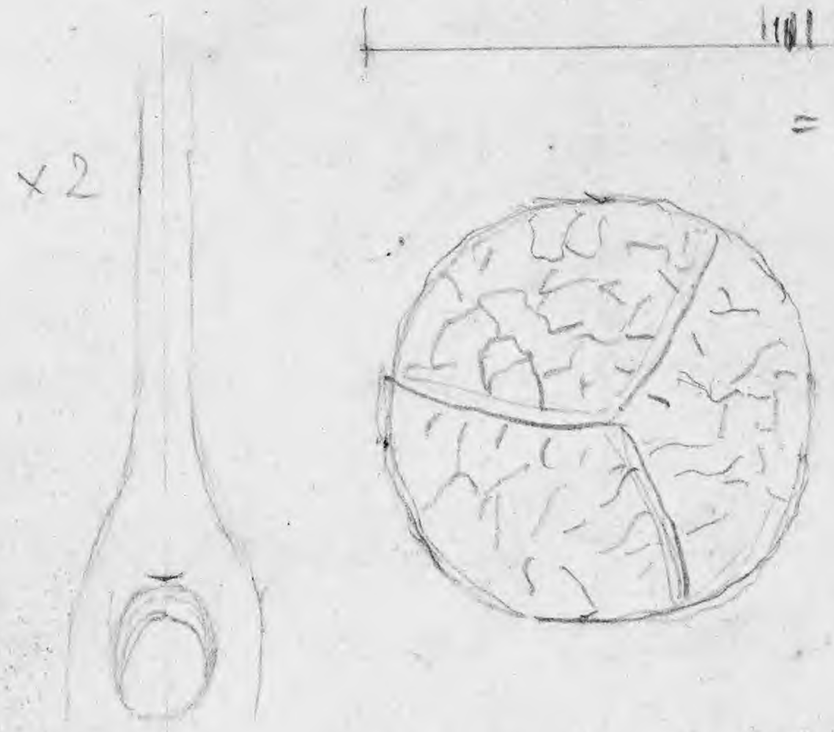
10–15 cm

10 – 20

stomata abundant

26.4 – 34.5 / 60

= 0.44 – 0.57 mm
diamt



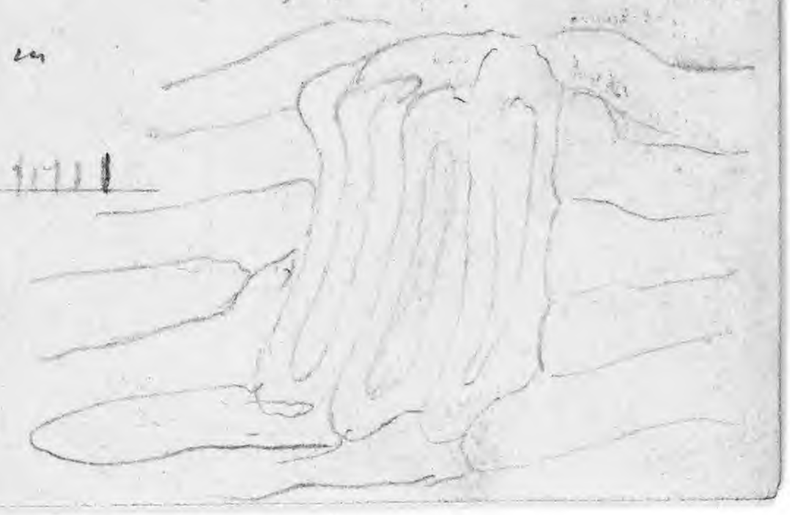
verified June 28

Jan 11 1867

sclerodermoids as Sporangium, but very lightly yellow, not brown!

0.028 – 0.034 mm

0.45 – 0.54



bastbundles very feebly developed, only 2 (Braun says) Think I have seen even 3 or 4

13728

Alex. Leitch,

APOTHECARY & CHEMIST,

Cor. 4th & Olive Sts., St. Louis.

A. Braun in litt. April 3, 1867

D. paupercula nobis; doubtful between ripario & lapla (as E. expressed himself in sending them) a hybrid? sporangia with pale coloured hyaline cells; macrospores large, ridges arose, somewhat reticulate below, scarcely differing from ripario, but with 2 median bast bundles!

I take it to be ripario! G. E. 28/8 67
after repeated investigation, which certainly shows some bast bundles in the stiff, rigid leaves.

Otto D'Amour,

Druggist and Apothecary,

North-West Corner of

BROADWAY & CHAMBERS ST.,

SAINT LOUIS, MO.

℞

13729

Isoetes riparia

In the Connecticut River, Brattleboro,

June 27 1867

C. C. Frost 1866

H Mainer mis

8–12 leaves

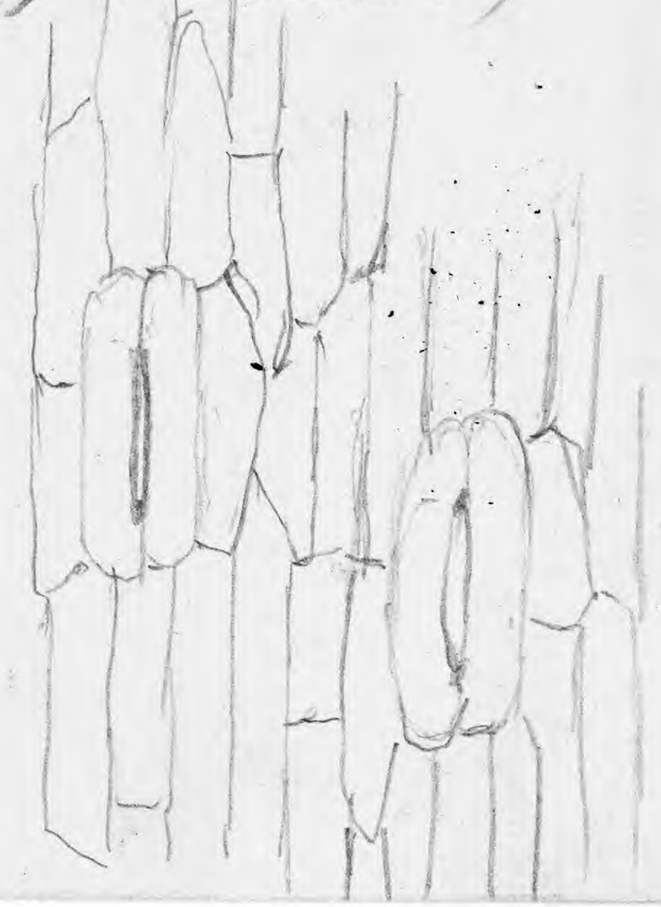
16–20 C. Ill Cy

macrosp.

diam $\frac{33.5-40}{60}$ = 0.56–0.66 mm

mostly 0.60

Crests of macrospores short often scarcely anastomizing, in others (especially below) almost reticulate! (apparently ? Bruchii!)



stomata abundant

× 280

$\frac{13-14.5}{4.15}$ = 0.031–0.035 mm

Brown sclerodermous cells in sporangium.

13730

Alex. Leitch,

APOTHECARY & CHEMIST,

Cor. 4th & Olive Sts., St. Louis.

N. 2 Isoëtes riparia Jan 31 1867

Crow River, Canada West

John Macoun July 18. 1864

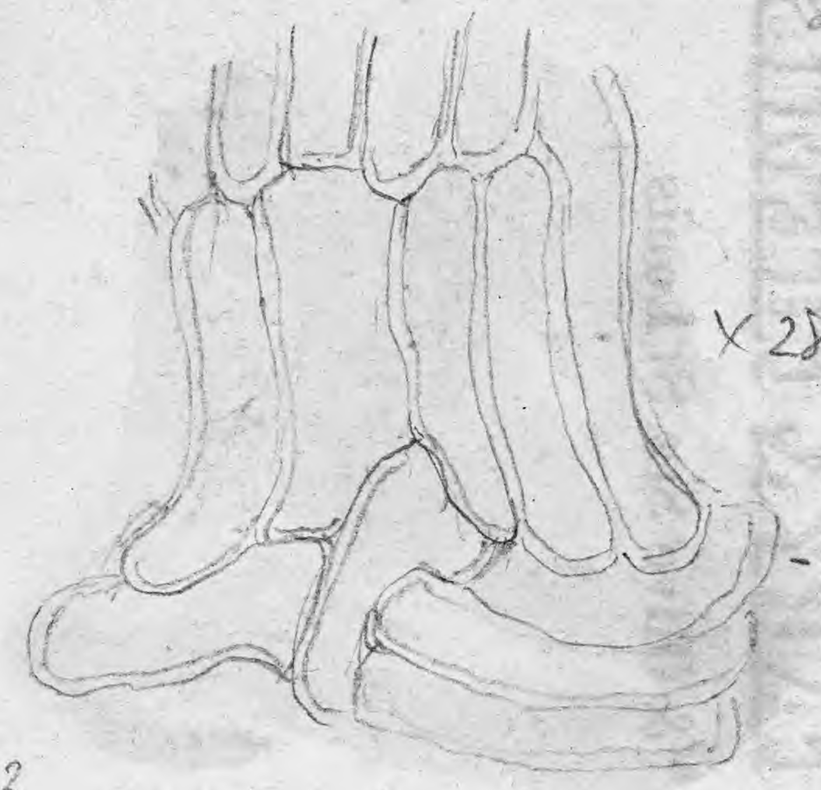
15–18 leaves
8–9 cm long

0.032 – 0.036 mm

$\frac{28.3 - 34}{60} = 0.47 - 0.57$ mm

diam of spores

Spores too incomplete to determine them



×280.

young sclerodermal cells ?

×2

×280

I could not find any stomata

yes! Jan 27 1867 I have found few stomata! no best bundles

13731

Alex. Leitch,

APOTHECARY & CHEMIST,

Cor 4th & Olive Sts. St. Louis.

Boletus

Oct 1 1866

muddy ponds, Hastings, Canada West

ex herb. Curtis

J. Macoun

Belleville, Canada West

about 15 leaves

8–13 C.M. long

diam of spores

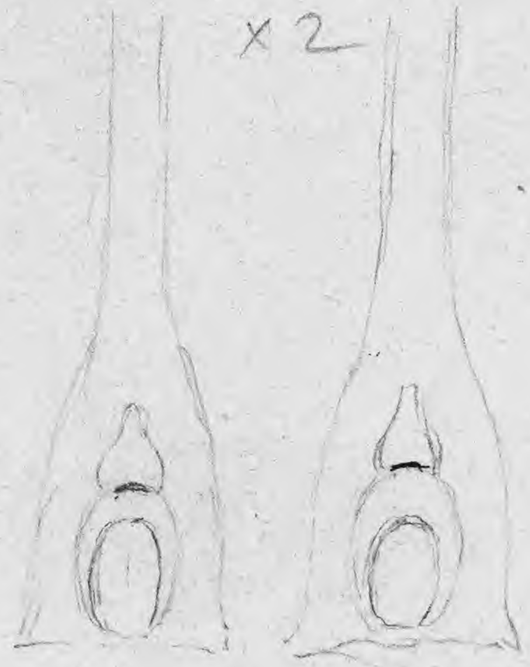
29.5 – 32.5 / 60 = 0.49 – 0.54 mm

× 415

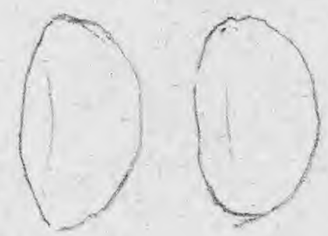
12 – 15 / 415 = 0.029 – 0.032 mm

about 0.03 mm

× 2



unripe



ridges twisted often anastomosing and there furrow-reticulate

2 exterior leaves of same plant, bearing macrospores

leaves thick, with much chlorophyll

27/6 67

no sclerodermatous in spores

× 280 few stomata and no basidia by observers.

13732

ALEX. LEITCH,

APOTHECARY & PHARMACEUTIST,

Marble Building Cor. Fourth & Olive Sts. St. Louis, Mo.